Identifier:	Revision:	Effective Date:	Reviewed Date:
SOP-04.05	**0**	**07/19/01**	**06/24/2004**

ER Document Catalog Number: **ER2001-0575**

Author: Patrick Longmire

environmental restoration project

A Department of Energy Environmental Cleanup Program

Environmental Restoration Project
Standard Operating Procedure

for:

LEACHING OF SOIL AND ROCK SAMPLES FOR ANIONS

Los Alamos
NATIONAL LABORATORY
Los Alamos, New Mexico 87545

Revision Log

Revision No.	*Effective Date*	*Prepared By*	*Description of Changes*	*Affected Pages*
R0	7/19/01	Patrick Longmire	New Procedure	All
Reviewed	06/24/2004	Mark Thacker	Deemed adequate.	All

Leaching of Soil and Rock Samples for Anions

Table of Contents

Leaching of Soil and Rock Samples for Anions

1.0 PURPOSE

This Standard Operating Procedure (SOP states the responsibilities and describes the process for leaching soil and rock samples and for measureing the amounts of major anions present using the ion chromatograph for the Envrionmental Restoration (ER) Project.

2.0 SCOPE

This SOP is a manadatory document and shall be implemented by all ER Project participants when performing Leaching of Soil and Rock Samples for Anions for the ER Project

Note: Subcontractors performing work under the ER Project's quality program shall follow this SOP for Leaching of Soil and Rock Samples for Anions or may use their own procedure(s) as long as the substitute meets the requirements prescribed by the ER Project Quality Management Plan, and is approved by the ER Project's Quality Program Project Leader (QPPL) before the commencement of the designated activities.

3.0 TRAINING

3.1 ER Project personnel using this SOP are trained by reading the procedure, and the training is documented in accordance with QP-2.2.

3.2 The **Field Team Leader** (FTL) shall monitor the proper implementation of this procedure and ensures that relevant team members have completed all applicable training assignments in accordance with QP-2.2.

4.0 DEFINITIONS

4.1 *DI H_2O*—Deionized water

4.2 *Site-Specific Health and Safety Plan (SSHASP)*—A health and safety plan that is specific to a site or ER-related field activity that has been approved by an ER health and safety representative. This document contains information specific to the project including scope of work, relevant history, descriptions of hazards by activity associated with the project site(s), and techniques for exposure mitigation (e.g., personal protective equipment [PPE]) and hazard mitigation.

5.0 BACKGROUND AND PRECAUTIONS

This SOP shall be used in conjunction with an approved SSHASP. Also, consult the SSHASP for information on and use of all PPE.

6.0 RESPONSIBLE PERSONNEL

The following personnel are responsible for activities identified in this procedure.

6.1 ER Project personnel

6.2 Field Team Leader

6.3 Laboratory Technican

6.4 University of California Representative

7.0 EQUIPMENT

7.1 A checklist of suggested equipment and supplies needed to implement this procedure is provided in Attachment A.

8.0 PROCEDURE

Note: ER Project personnel may produce paper copies of this procedure printed from the controlled-document electronic file located at http://erinternal.lanl.gov/home_links/Library_proc.shtml. However, it is each person's responsibility to ensure that they trained to and utilize the current version of this procedure. The author may be contacted if text is unclear. The Document Control Coordinator may be contacted if the author cannot be located

Note: Deviations from SOPs are made in accordance with QP-4.2, Standard Operating Procedure Development, and documented in accordance with QP-5.7, Notebook Documentation for Environmental Restoration Techncial Activities.

8.1 Perform Soil Drying

8.1.1 Prior to performing the leaching process the Laboratory Technation shall follow soil drying requirements in accordance with ASTM D 2216-90, Standard Test Method for Laboratory Determination of Water (moisture) Content of Soil and Rock, ASTM 1991.

8.2 Perform Leaching "Approach 1"

The **laboratory technican** shall perform the following steps:

8.2.1 Double wash a series of either 400mL or 600mL beakers and scoops and rinse with DI H_20. Allow them to completely dry.

8.2.2 Record all weighings, dates, and cample numbers in a laboratory notebook.

8.2.3 Calibrate the balance with several weighs that span the range that you will be weighing.

8.2.4 Weigh 100g of each sample directly into a clean, dry 400mL or 600mL beaker that should be tared to zero. One should ge within 0.01g of 100g for each sample weight.

8.2.5 Afterweighing each soil sample, add 150g of DI H20 to each sample with the same degree of accuracy as the soil. To facilitate reaching precisely 150.00g DI H2O, a dropper can be used.

8.2.6 Ensure each sample weight is then recorded in a lab notebook, as well as on the beaker.

8.2.7 Check scale calibration periodically to ensure accuracy.

8.2.8 Reweigh samples if calibrationis not satisfactory.

8.2.9 Stir each beaker thoroughly with a separate, clean scoop. Also, one process blank should be set up in a seprate 400mL or 600mL beaker for every 6 samples. The process bland consists of 200g of DI H2O.

8.2.10 Cover each beaker with foil or parafilm to avoid any evaporation while leaching takes place.

8.2.11 Label beakers both on the foil cover and on the actual beaker.

8.2.12 Gloves shall be worn and rinsed and/or replaced between the drfferent samples to avoid any cross contamination.

8.2.13 Samples should be allowed to equilibrate for at least 48 hours while leaching takes place and stirred at least twice a day with clean, dry glass stirring rods.

8.2.14 Stirring rods should be used only once per sample and then cleaned with IDI H2O before reuse.

8.2.15 After letting the samples settle for a few hours or overhight, an aliquot of the leachate can be filtered into an ion 9.0prior to filtration. By knowing the amount of dry soil and water used, the bulk density of the materials, the in-situ gravimetric moisture content,and the leachate concentrations, estimates of the pore water concentrations can be calculated.

8.3 Perform Leaching “Approach 2”

The **laboratory technican** shall perform the following steps:

8.3.1 Follow basic cleaning and weighing procedure above, except one can substitute Erlenmeyer flasks instead of beakers and put them on a shaker table to gently mix for 48 hours.

8.3.2 One can use 50g of solid and 75ml of DI water in a 250ml flask with good results.

8.4 Perform Lessons Learned

During the performance of work, ER Project personnel shall identify, document, and submit lessons learned, as appropriate in accordance with QP-3.2, Lessons Learned, located at: http://erinternal.lanl.gov/home_links/Library_proc.shtml.

9.0 REFERENCES

ER Project personnel using this procedure should become familiar with the contents of the following documents to properly implement this SOP

- ER Project Quality Management Plan
- QP-2.2, Personnel Orientation and Training
- QP-3.2, Lessons Learned
- QP-4.2, Standard Operating Procedure Development
- QP-4.4, Record Transmittal to the Records Processing Facility
- QP-5.7, Notebook Documentation for Environmental Restoration Techncial Activities
- U.S. Environmental Protection Agency (EPA). Methods for the Determination of Inorganic Substances in Environmental Samples (EPA/600/R-93/100), Determination of Inorganic Anions in Drinking Water by Ion Chromatorgraphy, Method 300.0.
- ER Project Field Implementation Plan for the Drilling and Testing of LANL Intermediate Zone Characterizaion Wells MCOBT-4.4 and MCOBT-8.5, ER2001-0419, May 2001 (LANL, 2001).
- ASTM D 2216-90, Standard Test Method for Laboratory Determination of Water (moisture) Content of Soil and Rock, ASTM 1991.

10.0 RECORDS

The analytical chemist is responsible for submitting an electronic record to the requester as well as an electronic record and hard copy to the ER-RPF. The analytical chemist is also responsible for submittal of other records which they may generate, those record types are listed below (processed in accordance with

QP-4.4, Record Transmittal to the Records Processing Facility) and must be submitted to Records Processing Facility.

10.1 Notebooks

10.2 Calibration Records

10.3 Analytical Data and or Results

11.0 ATTACHMENTS

Attachment A: Equipment and Supplies Checklist (1 page) located at http://erinternal.lanl.gov/Quality/user/forms.asp

Using a token card, click here to record "self-study" training to this procedure.

If you do not possess a token card or encounter problems, contact the RRES-ECR training specialist.

Equipment and Supplies Checklist

_____ 400 mL or 600mL beakers
_____ Deionized Water
_____ Balance
_____ 150.00g dropper
_____ Laboratory notebook
_____ Scoops
_____ Foil or parafilm
_____ Labels
_____ Gloves
_____ Dry glass stirring rods
_____ Ion chromatography sample vial
_____ Any PPE listed or required in the SSHASP
_____ Any additional supplies listed in associated procedures, as needed
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

SOP-04.05	Los Alamos Environmental Restoration Project